

Multicomponent Sensor K3R Instruction manual

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Functionality of the K3R sensors

The force sensor K3R110 is suitable for inspection tasks in quality assurance as well as in materials testing because of its compact design.

This precision force sensor is characterized by flat design of only 14 mm thickness up to 20 mm thickness.

The axial force Fz and the bending moments Mx and My are calculated from the strain gage signals of the 4 cantilever springs.

With the aid of a simple calibration matrix the forces and distances can be calculated as well.

Calibration Matrix for K3R Sensors

The sensors of the type K3R allow the measurement of the force Fz and the moments Mx and My.

The sensors K3R may be used for displaying 3 orthogonal forces Fx, Fy, and Fz, when the measured torques are divided by the lever arm z (distance of force application Fx, Fy of the origin of the coordinate system).

	ch1	ch2	ch3	ch4
Fz in N / mV/V	100,00	100,00	100,00	100,00
Mx in Nm / mV/V	0,00	-1,30	0,00	1,30
My in Nm / mV/V	1,30	0,00	-1,30	0,00
Н	0,00	0,00	0,00	0,00

The force in the z direction is calculated by multiplying and summing the matrix elements of the first row A1J with the lines of the vector of the output signals uj

Fz = 100 N/mV/V u1 + 100 N/mV/V u2 + 100 N/mV/V u3 + 100 N/mV/V u4

Example: on all 6 measurement channels is u1 = u2 = u3 = u4 = 1.00 mV/V displayed. Then a force Fz results of 400 N.

The calibration matrix A of K3R sensor has the dimensions 4 x. 4

The vector u of the output signals of the measuring amplifier has the dimensions 4×1 The result vector (Fz, Mx, My, H) has the dimension of 4×1

At the outputs of ch1, ch2 and ch3 after applying the calibration matrix, the force Fz and the moments Mx and My are displayed. On the Channel 4 output H is constantly displayed 0V by the fourth line.

Commissioning of the sensor

The "GSVmulti" software is used to show the measured forces and moments. The GSVmulti software and related manuals can be downloaded from the website <u>here</u>.



Step	Description					
1	Install the <u>Software GSVmulti</u>					
2	Connect the GSV-8DS measurement amplifier via the USB port; Connect the K3R sensor with the measurement amplifier. Note: use only the socket 1/6! For multi-pin connectors with seal, the union nut or the locker is stiff. Alternatively press the connector and tighten the union nut/lock. Switch on the measuring amplifier.					
3	Copy directory with calibration matrix (supplied with USB-stick) on appropriate drive and appropriate path.					
4	Start the Software GSVmulti					
5	Main window: Button AddChannel ; Select Device type: GSV-8 Select COMport Number: e. g. COM3; please find the proper COM-port in device manager, or when installing the driver on the appropriate system message Windows Input Channel: select Channels 1 to 6 Button Connect					
	Add Channel Remove this channel LengthX					
	Image: Load Settings Save Settings Open Session Plot Colour <- Click to change Communication Interface Save Session Communication Interface Save Session Communication Interface Save Session Communication Interface Save Session Communication Interface Save Session Communication Interface Save Session Communication Interface Save Session Communication Interface Save Session Connect Cancel					
6	Main window: Button Special Sensor Select Multi-axis sensor					



Step	Description				
	Open Session Save Session Please select sensor type Multi-axis sensor Rosette Calculate principal stress Display measured strain K Cancel				
7	Window "Multi-axis sensor settings: Button Add Sensor a) Button Open File/Dir select the directory with the file Serial number.dat. This file contains e. g. Measuring ranges of the sensor and cross-references to the file with calibration matrix (.matrix) b) Button OK				
	Componer Componer Componer Componer Open File / Dir Please select Componer OK Cancel Nm Componer OK Cancel Nm Nm Nm Componer				
8	c) Button Auto Rename Channels d) if necessary, select the displacement of the force application point e) Button OK				



Step	Description						
	Multi-axis Sensor						
	Sensor Sensors Add Sensor Number of Sensors 1 Number of sensors stored in device						
	Remove Enabled Sensor displayed Sensor Mode Storing location Three-axis Fz,Mx,My Z\17305828.dat						
	General Zero Signals Matrix						
	Channel assignment ForceZ Distance offsets Component 1: 1: ForceZ (3.1) TorqueX Component 2: 2: TorqueX (3.2) TorqueY Component 3: 3: TorqueY (3.3) Maximum Values (read onb)						
	Component 4: 4: dummy (3.4) V Force X 0 N Torque X 2 Nm						
	Component 5: Please select Force Y 0 N Torque Y 2 Nm						
	Component 6: Please select Force Z 100 N Torque Z 0 Nm						
	Auto-Rename Channels						
	OK Enable this sensor Disable this sensor Cancel						
10	Select Window "Recorder Yt", start measuring;						
	Comparizion Neurone Y Value Unplay Multi-axis sensor enabled. Force2. \$20 4,8551 N 100,0000 ForcepueY Molecular \$0,04259 Nm \$0,04259 Nm 70,0000 South Y \$0,04251 Nm \$0,04251 Nm 70,0000 South Y \$0,04551 Nm/V \$0,04551 Nm/V						
	30,0000						
	-25,0000						
	-50,0000						
	-75,0000						
	-100,0000 1438 11,4447 1438 11,5022 1436 11,6032 1436 11,7032 1436 11,6032 1436 11,6032 1436 11,002 1436 11,502 1436 1						



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Changelog

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